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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,186	10/29/2003	Meng-Chi Hung	252011-1730	6584
47390	7590	08/09/2005	EXAMINER	
THOMAS, KAYDEN, HOSTEMEYER & RISLEY LLP 100 GALLERIA PARKWAY SUITE 1750 ATLANTA, GA 30339			OWENS, DOUGLAS W	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/696,186

Applicant(s)

HUNG ET AL.

Examiner

Douglas W. Owens

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) 36-69 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 11, 23, 24 and 29-35 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 5-10, 12-22 and 25-28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/29/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of the first embodiment, claims 1 – 35 in the reply filed on January 31, 2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Objections

2. Claim 3 is objected to because of the following informalities: Claim 3 draws reference to multiple bonding pad structures. There is no antecedent basis for such limitations since the previous claims only recite a single bond pad structure. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4, 5, 9 – 11, 23, 24, 29 and 33 – 35 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 6,426,555 to Hsia et al.

Regarding claim 1, Hsia et al. teach a bonding pad structure, (Figs. 5 – 9) comprising:

a substrate having a bonding region and a sensing region (Col. 1, lines 53 – 56; the sensing region would be required for the electrical probing);

a first dielectric layer (15) overlying the substrate and having a dielectric island surrounded by a ring-shaped trench (91);

a first conductive layer (54) formed in the ring-shaped trench of the first dielectric layer;

a passivation layer (42-44) formed overlying the first dielectric layer and having an opening, wherein the opening corresponds to the bonding region and the sensing region and exposes the dielectric island and a part of the first conductive layer; and

a second conductive layer (33) covering the opening of the passivation layer and electrically connected to the first conductive layer.

Regarding claim 4, Hsia et al. teach a bonding pad structure, wherein the width of the first conductive layer is with the range of 1 – 50 microns (Col. 2, lines 55 – 57).

Regarding claim 5, Hsia et al. teach a bonding pad structure, wherein the depth of the first conductive layer is within the range of 0.5 – 2 microns (Col. 2, lines 55 – 57).

Regarding claim 9, Hsia et al. teach a bonding pad structure, wherein the trench of the first dielectric layer is a quadrilateral ring.

Regarding claim 10, Hsia et al. teach a bonding pad structure, wherein the first conductive layer is a quadrilateral ring.

Regarding claim 11, Hsia et al. teach a bonding pad structure, wherein the second conductive layer is a quadrilateral solid.

Regarding claim 23, Hsia et al. teach a bonding pad structure, further comprising:

Art Unit: 2811

an extension portion of the first conductive layer extending away from the bonding region and the sensing region (the conductive layer extends away from these regions); and

a circuit under pad scheme formed underlying the extension portion of the first conductive layer (Col. 2, lines 50 – 55).

Regarding claim 24, Hsia et al. teach a bonding pad structure, wherein the CUP scheme comprises:

a circuit scheme formed underlying the extension portion of the first conductive layer; and

Hsia et al. inherently teach a plurality of conductive plugs electrically connecting the circuit scheme to the extension portion of the first conductive layer, since the connection is required for communication with the circuit.

Regarding claim 29, Hsia et al. inherently teach a bonding element overlying the second conductive layer within the bonding region, since that is the purpose of a bonding pad.

Regarding claim 33, Hsia et al. teach a bonding pad structure, wherein the first conductive layer is copper, AlCu alloy or a copper manganese alloy (Col. 3, lines 2 – 6).

Regarding claim 34, Hsia et al. teach a bonding pad structure, wherein the second conductive layer is aluminum (Col. 3, lines 50 – 58).

Regarding claim 35 Hsia et al. teach a bonding pad structure, wherein the first dielectric layer is fluorinated silicon glass, a low-k dielectrics or silicon-based dielectrics.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 30 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia et al. as applied to claims 1 – 29 above, and further in view of US Patent No. 4,341,594 to Carlson et al.

Regarding claim 30, Hsia et al. do not teach a bonding pad structure, wherein the bonding element is a conductive ball or conductive bump. Carlson et al. teach a bonding pad structure, wherein the bonding element is a conductive bump (18). The conductive bump is commonly used in the art with bonding pads. It would have been obvious to one having ordinary skill in the art to incorporate the teaching of Carlson et al. into the device taught by Hsia et al., since it is desirable to form structures that have art recognized reliability.

Regarding claims 31 and 32, Hsia et al. do not teach a barrier layer comprising Ti, TiN, W, WN, Ta or TaN between the first and second conductive layers. Carlson et al. teach a Ti barrier layer between conductive layers (Col. 2, lines 61 – 64). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Carlson et al. into the device taught by Hsia et al., since it is desirable to prevent unwanted diffusion between structures of the device.

Allowable Subject Matter

7. Claims 2, 6 – 8, 12 – 22 and 25 – 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W. Owens whose telephone number is 571-272-1662. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven H. Loke can be reached on 571-272-1657. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Douglas W Owens
Examiner
Art Unit 2811

DWO